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Reducing Medication Risks in Older Adult Drinkers

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Abstract

Objectives: Prevalent concomitant alcohol and medication use among older adults is placing this group at risk for adverse health events. Given limited existing interventions to address concomitant alcohol and medication risk (AMR), a brief educational intervention was demonstrated. The purpose of the current study was to examine change in AMR behaviors 3 months post-education among older adult drinkers. **Methods:** A convenience sample of 58 older adult drinkers (mean age = 72) was recruited and followed (n = 40; 70% at follow-up), from four pharmacies in rural Virginia. **Results:** Findings indicated decreased alcohol consumption in high-risk drinkers. **Conclusion:** Future research should explore methods to sustain reduced AMR.

Keywords

alcohol, medication interactions, aging, community health

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Introduction

Many common medications interact with alcohol, creating detrimental metabolic (pharmacokinetic) and therapeutic (pharmacodynamic) changes (Weathermon & Crabb, 1999). Currently, 51% to 78% of aged (50+ years) adults are prescribed an alcohol-interactive medication, the most common being antidepressants, analgesics, cardiovascular, central nervous, and metabolic agents (Breslow et al., 2015; Weathermon & Crabb, 1999), with up to 60% taking an alcohol-interactive medication and consuming alcohol (Cousins et al., 2014; Holton et al., 2017). Yet, no successful interventions are being widely implemented, beyond drug labeling, to reduce rising alcohol–medication interaction rates in aging adults (Castle et al., 2016; Onder et al., 2002; Zanjani, Crook, et al., 2016), despite the cost benefits seen in educational trials (Bocchi et al., 2018; Haines et al., 2013; Harper et al., 2019; Kasteng et al., 2018). Knowledge change is focal to educational campaign evaluations (Hillsdon et al., 2001), but little information is available on knowledge change impact in the area of alcohol, aging, and medication safety.

As the older adult alcohol consuming population in the United States continues to grow, alcohol use has become an increasing public health concern (National Center for Chronic Disease Prevention and Health Promotion, 2007). Recommended alcohol consumption limits are defined by the National Institute on Alcohol Abuse and Alcoholism as no more than one drink a day for women of any age and men aged 65 years and older (National Institute on Alcohol Abuse Alcoholism, 2007). The current prevalence of past-week alcohol consumption is at 60% and the prevalence of drinking more than recommended limits is at 29% among older adults aged 50 and older (McEvoy et al., 2013). Furthermore, 11% of adults aged 50% to 64% and 7% of adults aged 65 and older meet criteria for alcohol use disorder (Blazer & Wu, 2011).

What complicates the growing alcohol use in our aging adults is that almost 90% of adults aged 60 and over take at least one prescription medication, and over 75% take two or more (Gu et al., 2010; Kantor et al., 2015). Both acute and chronic alcohol use can modify the therapeutic effects of medication by changing the rate of absorption as well as changes to the physiological responses of organ systems (Chan & Anderson, 2014; Moore et al., 2007). In addition, many medications are specifically considered to be alcohol-interactive, causing

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differential medication effects and adverse health consequences (Weathermon & Crabb, 1999). The adverse health outcomes related to alcohol–medication interactions can be severe (Blazer & Wu, 2011; Heuberger, 2009). Consequently, recent studies have also shown increases in hospitalizations related to alcohol–medication interactions among older adults (Castle et al., 2016; Zanjani, Smith, et al., 2016).

Given the high and growing prevalence of both alcohol consumption and use of medications in older adults, risk of experiencing an alcohol–medication interaction is high. Brief interventions have been shown to decrease harmful alcohol use among older adults (Gordon et al., 2003; Schonfeld et al., 2010). Despite the overwhelming growing risk, there have been limited efforts to widely implement community-level educational interventions aimed at alcohol–medication risk (AMR; Cain, 1993). To address these gaps, this research team developed and demonstrated a brief, educational AMR intervention for older adults. The aim of the current study is to build on prior positive intervention findings (Zanjani et al., 2018c), by focusing on the older adult alcohol users.

Method

Data Collection

From September 2015 to August 2016, a convenience sample of 134 older adults was recruited from four pharmacies in Virginia. Participants were eligible for the study if they were 60 years of age or older. Participants took a survey to assess their AMR health behaviors and awareness prior to and after exposure to the educational materials. In addition to the baseline assessment, a 3-month assessment was done to examine change overtime. All participants were contacted a minimum of 4 times to participate in the follow-up assessment, achieving a 72% follow-up rate. All study procedures had IRB approval, and all participants provided consent prior to study participation, described in detail in earlier publications (Zanjani et al., 2018a, 2018b, 2018c).

The current analysis focused on participants who indicated at baseline that they had consumed alcohol in the past month, and were successfully reached for follow-up 3 months later, making for an analytic sample of $n = 40$ participants. Given a focus on 3-month change, particularly in regard to alcohol change, only the baseline (Time 1) and follow-up (Time 3) data were analyzed. Sixteen participants were classified as high-risk drinkers because they indicated at baseline that they consumed two or more drinks a day, seven or more drinks a week, and/or three or more drinks during 1 day in the past 30 days. Five of these high-risk drinkers were randomized to pilot brief health coaching, of which three participants completed. These three participants ranged in age from 68 to 77 and included two males and one female.

The analytical sample ($n = 40$, Table 1) was 60% female and 100% White, and the majority of participants were married or widowed (85%) and had completed an associate's degree or higher (78%). Most of the participants were retired (65%) and reported a past-year household income of US$50,000 or more (53%). The sample was relatively healthy at baseline, with the majority (63%) reporting no physical or mental limitations that significantly impeded their life activity as well as past 30-day exercise (85%) and daily fruit and vegetable intake (95%). Ninety-five percent of participants reported current medication use at baseline, putting all but two participants at risk for an alcohol–medication interaction. No drinking group differences were found for sample characteristics (Table 1).

An attrition analysis on the 58 older adult drinkers at baseline yielded that 3-month assessment completion was associated with being married ($p = .028$), higher education levels ($p = .027$), and higher income levels ($p = .015$), confirming the need for the inclusion of these demographic variables in analyses as potential confounders. When comparing the total sample, with the sample that completed the 3-month follow-up ($n = 40$), and the 18 adults that did not complete the 3-month follow-up, there were differences, indicating lower levels of willingness to talk to a doctor ($p = .013$) or friends ($p = .46$) about alcohol–medication interactions and willingness to change alcohol behaviors ($p = .46$). There were no identified differences in drinking levels or baseline knowledge and awareness between groups.

Educational Intervention

This brief AMR educational intervention consisted of an informational poster, brochure, and 60-s video public service announcement, developed by the research team (Zanjani, Crook, et al., 2016; Zanjani et al., 2013). The feasibility as well as the acceptability of the developed educational materials were evaluated earlier (Zanjani et al., 2018a). The educational materials were grounded in the health belief model (Janz & Becker, 1984; Noar, 2006), and the information–motivation–behavioral skills (IMB) model (Fisher & Fisher, 2000). The educational materials included information about AMR and recommendations for visiting the emergency room, if someone is experiencing an emergency AMR event.

Measures

Behaviors. Participants were asked about their alcohol use, and whether they drank more than three alcoholic drinks in 1 day during the past 30 days. Participants also reported the average number of alcoholic drinks they consumed in a typical week in the past 30 days. Also, at both time points, participants were asked about the frequency in which they talked to their doctor or

Table 1. Baseline Sample Characteristics, by Drinking Status ($n = 40$).

Sample Characteristics	High-risk drinkers ($n = 11$)	Low-risk drinkers ($n = 29$)
	$M \pm SD$	$M \pm SD$
Age (59–89)	70.4 ± 5.8	72.8 ± 7.5
	n (%)	*n* (%)
Gender		
Male	7 (63.6)	9 (31.0)
Female	4 (36.4)	20 (69.0)
Race/ethnicity		
Non-Hispanic White	11 (100.0)	29 (100.0)
Other race/ethnicity	0 (0.0)	0 (0.0)
Highest level of education		
High school/GED	2 (18.2)	7 (24.1)
Associate's degree	2 (18.2)	7 (24.1)
Bachelor's degree or higher	7 (63.6)	15 (51.7)
Employment status		
Employed	4 (36.4)	8 (27.6)
Homemaker	0 (0.0)	1 (3.4)
Unemployed	0 (0.0)	1 (3.4)
Retired	7 (63.6)	19 (65.5)
Marital status		
Single, never married	0 (0.0)	1 (3.4)
Married/domestic partnership	6 (54.5)	18 (62.1)
Widowed	4 (36.4)	6 (20.7)
Divorced	1 (9.1)	4 (13.8)
Household income		
Under US$25,000	1 (9.1)	3 (10.3)
US$25,000– US$49,999	2 (18.2)	4 (13.8)
US$50,000– US$99,999	3 (27.3)	9 (31.0)
US$100,000 and above	4 (36.4)	5 (17.2)
Prefer not to answer	1 (9.1)	8 (27.6)
Current health conditions		
None	0 (0.0)	6 (20.7)
Only one	3 (27.3)	7 (24.1)
More than one	8 (72.7)	16 (55.2)
Physical/mental limitations		
None	6 (54.5)	19 (65.5)
Some	4 (36.4)	8 (27.6)
Major	1 (9.1)	2 (6.9)
Current medications		
None	0 (0.0)	2 (6.9)
Over the counter (OTC) only	0 (0.0)	1 (3.4)
Prescription only	1 (9.1)	9 (31.0)
Both OTC and prescription	10 (90.9)	17 (58.6)
Past 30 days:		
Exercised	9 (81.8)	25 (86.2)
Smoked cigarettes	0 (0.0)	5 (17.2)
Used smokeless tobacco	0 (0.0)	2 (6.9)
Ate a fruit/vegetable at least once a day	10 (90.9)	28 (96.6)
Medication interactions		
Experienced a prescription drug interaction/adverse medication event?	17 (63.6)	16 (55.2)
Specifically experienced an alcohol and prescription drug interaction?	1 (9.1)	3 (10.3)
During the past 3 months, experienced a prescription drug interaction/adverse medication event?	1 (9.1)	5 (17.2)
During the past 3 months, experienced an alcohol and prescription drug interaction?	0 (0)	0 (0)

Note. Chi-square tests and independent *t* tests were used to examine the association between sample characteristics and drinking status. No group differences were found. GED = general educational development.

pharmacist about the potential for health events (always, occasionally, sometimes, rarely, or never).

Intentions. Participants were asked (yes/maybe, no) about their willingness to talk to their doctor about AMR, change how much alcohol they consumed to prevent health events, talk to friends and family about risk, and be an advocate for safe alcohol and prescription drug use. At 3-month follow-up, participants were also asked whether they had engaged in these behaviors during the last 3 months (yes or no).

Awareness. Participants were asked about medications and alcohol that can be used safely together and the safe level of alcohol consumption. In addition, participants were asked about what medications they believe are potentially dangerous when taken with alcohol. A continuous variable ranging from 0 to 5 was created to represent the number of potentially dangerous medications indicated. Participants were also asked about AMR side effects, including vomiting, falls, and shortness of breath. A continuous variable ranging from 0 to 17 was created to represent the number of side effects indicated. Participants were also asked four medication literacy dichotomous questions (yes or no).

Statistical Analyses

Analyses were completed using all available data at each time point, and descriptive statistics were used to calculate the frequencies and means of all variables of interest. To examine change from baseline to 3-month follow-up, a generalized estimating equations (GEE) approach was used. Linear models were fit for variables with a scale response, ordinal logistic models were fit for variables measured on an ordinal scale, and binary logistic models were fit for dichotomous variables. Table 1 shows no characteristic differences between the drinking groups. However, gender, marital status, education, and income were included as potential confounders in all models, given attrition findings and that prior studies have shown that male gender (Aira et al., 2005; Barnes et al., 2010; McCaul et al., 2010), being married, higher socioeconomic status (Britton & Bell, 2015), and higher education levels are associated with increased alcohol consumption among older adults.

Results

Behaviors

There was statistical decline for the mean drinks consumed for high-risk drinkers from 15 drinks to 7 drinks/week ($p < .01$). There was no statistically significant change from baseline to follow-up in frequency of talking to a doctor or pharmacist about AMR, drinking during the past 30 days, and binge drinking.

Intention

There was no statistically significant change from baseline to follow-up in willingness to talk to a health professional about AMR, change alcohol consumption to prevent health events, talk to friends and family about AMR, or be a community advocate. The scores on these items were relatively high at baseline, with the majority of participants indicating willingness to talk to a health professional about AMR (90%+), change alcohol consumption to decrease their risk (90%+), and talk to their friends and family about AMR (90%+). At baseline, 80% of participants indicated they would be willing to advocate for AMR reduction in their communities; however, this significantly ($p = .048$) decreased to 60% of all drinking participants at the 3-month follow-up. When participants were asked on the follow-up assessment whether they had performed these behaviors, 20% had spoken to a health professional about AMR, 28% had changed their alcohol consumption to prevent adverse health events, 30% had talked to their friends or family about AMR, and 10% acted as a community advocate. No drinking group differences were found for intentions.

Awareness

There was a significant increase in the number of identified AMR side effects and alcohol-interactive medications among all drinkers (see Table 2). Overall, there were significant increases over time in identifying the number of potentially dangerous medications when mixed with alcohol ($p < .001$; $p = .004$) and potential side effects ($p < .001$; $p < .001$) in all drinkers. There was no statistical improvement in medication health literacy.

Discussion

The study demonstrated a brief education intervention focused on alcohol–medication interaction risks among older adults. In this sample of older adult drinkers, the overwhelming majority were currently taking both prescription and nonprescription medications, confirming the need to encourage safe alcohol and medication practices. The results of this study showed improved elements of AMR behavior and awareness over time, with a greater change in high-risk drinkers.

Between baseline and follow-up, it was encouraging that most of the high-risk drinkers indicated that over the past 3 months they had changed how much alcohol they consumed to prevent adverse health events. Participants also noted talking to clinicians, friends, and family about AMR. Improvement was also seen over time for identifying potentially dangerous alcohol-interactive medications

Table 2. Change Among Drinkers Reached at 3-Month Follow-Up.

	High-risk drinkers ($n = 11$)		Low-risk drinkers ($n = 29$)	
	Pre-test	Follow-up	Pre-test	Follow-up
Behaviors				
Talk with your doctor or pharmacist about how alcohol can interact with your prescription medication?				
Always, *n* (%)	1 (9.1)	2 (18.2)	3 (10.3)	3 (10.3)
Occasionally, *n* (%)	1 (9.1)	2 (18.2)	1 (3.4)	3 (10.3)
Sometimes, *n* (%)	3 (27.3)	1 (9.1)	10 (34.5)	3 (10.3)
Rarely, *n* (%)	4 (36.4)	2 (18.2)	7 (24.1)	8 (27.6)
Never, *n* (%)	2 (18.2)	4 (36.4)	8 (27.6)	12 (41.4)
Drink any alcohol in the past 30 days? *n* (% yes)	11 (100.0)	9 (81.8)	29 (100.0)	27 (93.1)
Drink more than three alcoholic drinks in 1 day in the past 30 days? *n* (% yes)	6 (54.5)	5 (45.5)	0 (0.0)	1 (3.4)
Reported number of drinks in a typical week in the past 30 days.[a,b] *M* (*SD*)	14.8 ± 17.7	6.7 ± 6.1	3.1 ± 2.4	3.1 ± 2.5
Intentions (% yes)				
Talk to your doctor or pharmacist about AMR?	11 (100.0)	11 (100.0)	26 (89.7)	26 (89.7)
In the past 3 months, did you talk with your doctor or pharmacist about how alcohol can interact with your prescription medication? *n* (% yes)	—	4 (36.4)	—	4 (13.8)
Change how much alcohol you consumed to prevent AMR?	10 (90.9)	10 (90.9)	26 (89.7)	24 (82.8)
In the past 3 months, did you change how much alcohol you consumed in order to prevent harmful prescription drug interactions?[c] *n* (% yes)	—	6 (54.6)	—	5 (17.2)
Talk to friends and family about AMR?	10 (90.9)	10 (90.9)	28 (96.6)	28 (96.6)
In the past 3 months, did you to talk to friends and family about how alcohol can cause harmful prescription drug interactions? *n* (% yes)	—	3 (27.3)	—	9 (31.0)
Act as a community advocate to reduce AMR?[b]	10 (90.9)	7 (63.6)	22 (75.9)	17 (58.6)
In the past 3 months, did you act as a community advocate for safe alcohol and prescription drug use? *n* (% yes)	—	1 (9.1)	—	3 (10.3)
Awareness (% yes)				
Identify when medications and alcohol can be used safely together?				
Always	0 (0.0)	0 (0.0)	2 (6.9)	1 (3.4)
Occasionally	0 (0.0)	3 (27.3)	0 (0.0)	1 (3.4)
Sometimes	7 (63.6)	8 (72.7)	14 (48.3)	13 (44.8)
Rarely	4 (36.4)	0 (0.0)	9 (31.0)	10 (34.5)
Never	0 (0.0)	0 (0.0)	4 (13.9)	4 (13.8)
Identify safe amount of alcohol?				
0 drinks—no alcohol is ever safe	1 (9.1)	1 (9.1)	8 (28.6)	5 (19.2)
No more than one drink a day	4 (36.4)	5 (45.5)	16 (57.1)	20 (76.9)
No more than two drinks a day	4 (36.4)	4 (36.4)	4 (14.3)	1 (3.8)
Three drinks a day or more	2 (18.2)	1 (9.1)	0 (0.0)	0 (0.0)
Identify alcohol-interactive medications (out of 5)[a,b,d] *M* ± *SD*	2.5 ± 1.0	3.6 ± 1.4	2.6 ± 1.3	3.6 ± 1.4
Identify AMR side effects (out of 17)[a,b,d] *M* ± *SD*	10.3 ± 4.1	15.2 ± 1.2	9.7 ± 5.5	14.8 ± 2.4
Need instructions, pamphlets, or other written material from your doctor or pharmacy? *n* (% yes)	3 (27.3)	3 (27.3)	10 (35.4)	9 (31.0)

(continued)

Table 2. (continued)

	High-risk drinkers ($n = 11$)		Low-risk drinkers ($n = 29$)	
	Pre-test	Follow-up	Pre-test	Follow-up
Can name specific drug interactions that your medication(s) can have? *n* (% yes)	6 (54.6)	3 (27.3)	12 (42.9)	10 (34.5)
Know at least one side effect of each of your medication(s)? *n* (% yes)	9 (81.8)	11 (100.0)	14 (50.0)	22 (75.9)
Know which of your medication(s) should not be taken with alcohol? *n* (% yes)	7 (63.6)	9 (81.8)	15 (53.6)	21 (72.4)

Note. Analyses were linear, ordinal logistic, and binary logistic GEE models that control for gender, marital status, education, and income. AMR = alcohol and medication risk.
[a]Significantly different ($p < .05$) over time among high-risk drinkers. [b]Significantly different ($p < .05$) from pre-test to follow-up among all drinkers. [c]Significantly different ($p < .05$) between high-risk and low-risk drinkers. [d]Significantly different ($p < .05$) over time among low-risk drinkers.

and their side effects. This finding was similar to previous analyses of older adult drinkers showing a significant short-term increase in identifying both the number of medications that are potentially dangerous when mixed with alcohol and the number of side effects identified (Aira et al., 2005).

The findings of this study should be viewed in the context of its limitations. The study is limited primarily by the small sample size; thus, the study findings need to be viewed as preliminary requiring follow-up in larger samples for verification. The data also were collected from a single state and the sample was 100% non-Hispanic White; therefore, study results may not generalize to older adults from other geographic locations or racial/ethnic backgrounds. In addition, self-report data are subject to social desirability bias (van de Mortel, 2008) and may have led to an underreporting of risky alcohol use behaviors. This study only analyzed participants who were reached for the 3-month follow-up, making the impact on those older adult drinkers who did not participate in the follow-up assessment ($n = 18$) unknown, making findings less generalizable.

Implications

This study is one of the first brief education intervention demonstration, focused on alcohol–medication interaction risk among older adults. The majority of the study sample of older adult drinkers was currently taking both prescription and nonprescription medications, confirming the need for behavioral health interventions that encourage safe alcohol and medication use. Prior analyses have confirmed increased AMR awareness, willingness to engage in AMR health behavior change, and perceived importance of AMR messaging immediately post-education exposure. The results of this study showed improved AMR awareness over time, and decreased drinking levels in drinkers. Future research needs to explore individual barriers for adherence and enhanced behavioral health interventions that can sustain concomitant alcohol–medication use safety practices. Future research should examine larger, more diverse samples of older adults, including a control group comparison. In addition, future work needs to consider including more specific tailored guidelines for engaging in AMR reduction health behaviors, including targeting conversations with a health professional about the risk for alcohol–medication interactions.

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Declaration of Conflicting Interests

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Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

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